Financing Investments in Reforestation with Government Sponsored Loans

(A Mississippi Case Study)

by

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Abstract

Lack of reforestation after harvest by nonindustrial, private forest (NIPF) Iand owners threatens the sustainability of Mississippi's $1 I .4 b 11'ton forestry and forest products industries. One reason NIPF landowners do nor reforest is the absence **of** available credit to finance the relatively high cost of reforestation investments. The proposed Mississippi Reforestation Investment Program (MRIP) is designed to address this credit marker failure. The MRIP offers the following unique features:

- 100 percent debt financing of rhe total cost of reforestation:
- competitive rate of inrerest;
- repayment provisions tied to timber harvests;
- 35-year loan maturity;
- insurance coverage of most downside risks;
- linkage to Mississippi's new 50 percent investment tax credit; and
- the collateral employed to secure the loan.

Marginal analyses of cash flows from a MRIP-financed reforestation investment versus doing nothing to provide for reforestation reveal the program to be most attractive to qualifying NIPF landowners.

Introduction

Background

Softwood and hardwood timber inventories in the southern U.S. increased continuously throughout the 1360s and 1970s. Demands for southern timber expanded as both domestic and international economies grew (Cubbage et al. 1335). However, Powell et al. (I 993) pointed out that for the first time since 1952, inventories for southern softwood had declined from 1987 to 1332. Recent examinations of the Forest Inventory and Analysis (FIA) data and timber inventories at state and survey unit levels suggest that many areas in the South could experience significant timber inventory declines (Cubbage et al. 1995).

Timber availability has become an issue across the South as supplies from ocher regions are constrained and as demand for timber continues to grow (Abt et al. 1998). It is important to note that while the timber industry competes in national and international markets, supply issues are generally local and regional. Recent FIA analyses (including state data from 1 987 co 1993) indicated that annual removals of sofnvood timber exceeded annual growth in most of the large softwood producing states: Alabama, Arkansas, Georgia, Louisiana, Mississippi, South Carolina, and Texas (Cubbage et al. 1995). The average annual growth-to-removal ratio of growing stock in the South was 0.95: 1 for softwoods and 1.56: 1 for hardwoods. Furthermore, Cubbage et al. reported that for softwoods, 20 of the South's 5 1 total forest surveys had removals that exceeded growth.

The greatest opportunity co raise the South's forest productivity rests with nonindustrial private forest (NIPF) owners (USDA Forest Service 1988). Much of the southern forest land (122 million of 182 million acres, or 67 percent) is held by this ownership group. The failure of NIPF owners to adequately regenerate pine stands after harvest on much of their land has significantly contributed to the decline in softwood inventories. The reason many NIPF owners gave for not reforesting following harvest was that they assumed rhat the areas would reforest by themselves or that reforestation costs were too high.

hlississippi's contribution to the South-wide harvest is high in relation co its amount of timberland. Mississippi comprises 10 percent of the South's timberland, but contributes 12 and 15 percent of Southern softwood and hardwood timber removals, respectively (Abt et al. 1938). With 75 percent of Mississippi's removals coming from NIPF lands, what these landowners do (or do not do) can have significant effects on total local timber supply.

Each year in Mississippi tens of thousands of acres of NIPF holdings are not being properly regenerated after timber harvest. This raises serious questions about future timber supply in Mississippi; it also questions the impact good regeneration would have upon financial returns from these lands. An important policy issue is whether to implement additional public programs or private efforts to stimulate timber supplies and, thus, alleviate the potential for future timber scarcity.

Several significant pieces of federal and state legislation have been enacted co hvorlinfluence the management of NIPF lands. TheyIncdu eht e f-deral Forestry Incentives Program (FIP) and Conservnrion Reserve Program (CRP), plus the Scare of Mississippi's Foresr Resource Development Program (FRDP) and new Reforestation Tax Credit (RTC). However, appropriations for the federal programs are shrinking and demand for FRDP monies exceeds available funds in most years. As a consequence, new approaches to addressing the reforestation issue need to be examined.

One reason NIPF landowners do not reforest is the lack of funds and the absence of long-term credit to finance reforestation investments. To address this credit market failure,

the Mississippi Special Task Force for Economic Development Planning has proposed the Mississippi Reforestation Investment Program (MRI P). This current research effort evaluated the proposed program and refined and/or developed various components. T le ina result is a recommended model to be considered for government implementation. With minimal modification, the model could be implemented in ocher states, at the federal level and perhaps even at rhe local level.

The Basic Concept

The basic concept is for the Srate of Mississippi to sell long term, zero-coupon municipal bonds and use the proceeds from the sale of the bonds to finance reforestation investments on suitable NIPF lands. A qualifying landowner would receive a loan covering up to 100 percent of the cost of reforesring a property. Principal and interest on the loan would be repaid from the revenue generated from future timber sales resulting from the reforestation investment.

Zero-Coupon Municipal Bonds

A zero-coupon municipal bond is a debt obligation sold by a state, territory, municipalicy, city, school district, public authority, or local government whose interest is reinvested until the bond reaches maturity (Downes and Goodman 1998). With a zero-coupon bond, no periodic interest payments are made. Rather, an investor receives a fixed lump sum at maturity that exceeds the principal amount. Interest earned is represented by the difference between the lump sum at maturity and the purchase price. Historically, municipal bonds have been exempt from federal income taxes and, frequently, from state and local taxes. Following the Tax Reform Act of 1986, private purpose municipal bonds (e.g., MRIP) are taxable at the federal level; public purpose municipal bonds remain tax exempt.

Related Studies

Studies of NIPF Landowners

A number of studies have analyzed the characteristics of NII'F landowners and their forest lands to determine which owner and ownership variables arc most predictive of forest management activity. The following section will review several significant themes used to understand NIPF owners and relate them to the main topics of this study (i.e., timberland investments, municipal bonds, and available financial incentives).

Collectively, NII'F landowners comprise a diverse ownership category. This diversity has been based on various land and owner characteristics: acres owned, age, education, occupation, tenure, attitudes, and motivations. Most landowner data comes from surveys such as "The Private Forest Land Owners of the Southern United States" (Birch 1994).

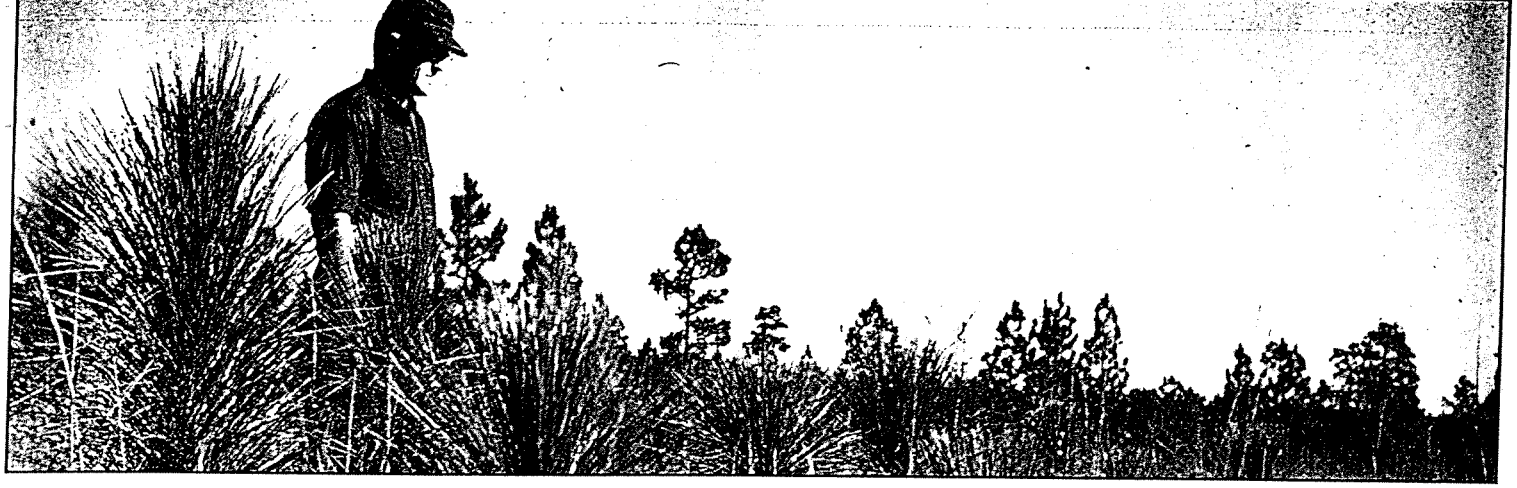
In their study of 48 Mississippi NII'F landowners, Baird et al. (I 986) reached the following conclusions:

- regardless of how NII'F landowners are grouped or categorized, the important differences within each category should be considered in policy making and program planning;
- most owners of large tracts (300 acres and more) have definite management objectives and are able to pursue them;
- the greatest opportunities for increasing the contribution of NIPF lands is on mid-sized ownerships in the range of 100-300 acres, and
- local assistance efforts should nor ignore owners of woodlots of 40- 100 acres, for even these small woodland tracts are contributing to the wood supply

Srraka et al. (1984) reported three things that could enhance the positive relationship between timber production on NIPFs and tract size. First, larger tract sizes allow for greater economies of scale (on a per acre basis, larger tracts cost less to manage, and therefore, their higher expected returns encourage investment in forest management). Second, NIPF landowners who are not primarily interested in timber production (i.e., interested in recreation, aesthetics, or other benefits) can satisfy their needs from a relatively small acreage. Third, owners of larger tracts tend to have higher incomes and higher net worth than owner-s of smaller tracts. It follows, therefore, that owners of larger tracts are more likely to invest in forest management.

Bliss (1988) and Doolittle and Straka (1387) in their studies of landowners in Wisconsin and Alabama, respectively, dernonstrated that several factors motivate and influence landowners to manage their woodlands for profit. Bliss (I 388) applied a qualitative approach to identify management motivations of selected NIPF landowners in Wisconsin.' Bliss found thar, though this group of landowners represented a very small percent of landowners in Wisconsin, both internal and external factors motivate landowners to practice forest management. Internal factors were related to the landowners' sense of identity. For instance, the forest-related values and behavior-s of some managers are components of their ethnic heritage. Also, forest ownership and management contribute to family cohesiveness and intergenerational continuity. Additionally, forest ownership and management contribute to

'Bliss (I 988) selected forest managers from among county, state, and regional "Tree Farmer of the Year" award winners. This small number of individuals was recognized as arrive forest managers and their management motivations were explored in depth.



personal and social identity. Finally, some managers view management as a moral obligation.

Bliss also identified the following influences on the riming and extent of NIPF forest management activities. The importance of income production as a motivator of management varied considerably among managers. Access requirements are a strong disincentive to enrollment in some incentive programs. Cost-sharing of forestry projects was effectively a subsidy to practicing managers rather than an incentive to nonmanagers. The most effective public incentive was the personal influence of foresters in the field.

Doolittle and Straka (1987) used the diffusion of innovations model to explain the differences between forest landowners in Alabama who had regenerated their pine stands following recent clear- cutting and owners who had not regenerated. They reported that NIPF owners who had regenerated their pine stands following harvest were similar in many ways to early adopters as described in diffusion literature, while nonregenerators were similar to late adopters.[2] Early adopters were more inclined to attach a high level of importance to timber management, and scored higher on an attitude-toward-credit scale. Late adopters are reluctant to invest in forestry practices because they are neither venturesome nor risk takers.

In the Midsouth[3] a large proportion of NIPF owners are of advanced age and retired status. According to Rosson and Doolittle (1987), this may have important implications for future management and productivity, since the major ownership objective of many of these individuals is to pass the land to their heirs. Furthermore, Baird et al. (1 986) indicated that older individuals are reluctant to invest in stand improvements, because they are unlikely to see the ultimate results.

Using discriminant analysis techniques, Greene and Blatner (1 986) identified several woodland owner characteristics associated with timber management behavior in Arkansas. Greene and Blatner suggested that well-educated owners, owners of large tracts, farmers, and iii Arkansas's more urban northern regions, wage earners, old owners, and those who live on their tracts are likely either to be timber managers or to have a high propensity to manage. Meanwhile, likely to be non-managers are owners of hardwood timber types in the northern Arkansas regions, and real estate speculators, retired owners, and multiple heirs in the Arkansas Coastal Plains.

Greene and Blatner (1386) indicated further that management assistance programs aimed toward developing nontimber forest outputs (e.g. , grazing. wildlife and recreation) might yield more managed acres than strictly timber oriented programs. Finally, their model suggested that personal contacts by a forestry professional might be enough to influence many woodland owners to become timber managers.

Kurtz and Lewis (198 1) pointed out that to achieve communication with landowners, issues of major concern must be the focal point for anv form of assistance. Assistance programs must, therefore, suit landowner interests and characteristics.

In a study in Illinois, **Young** and Reichenbach (1 987) used a social/psychological model to explain why most traditional forestry assistance programs aimed at increasing timber production from NIPFs have not been as effective as hoped iii changing the behavior of forest owners. The authors found that several outcomes associated with producing timber and several evaluations of those outcomes differ between intenders and nonintenders in Illinois. Landowners who intended to harvest timber within the next 10 years had significantly stronger beliefs associating timber production with providing for personal needs, increasing the amount of wildlife, and providing a supplementary income. Nonintenders had a stronger association between timber production, disrupting nature and affecting the enjoyment of natural scenery. **Young** and Reichenbach concluded chat in order to increase the owner's intentions to produce timber for profit, their beliefs must be changed.

In forest landowner studies the use of focus groups has been a significant technique used to examine what motivates landowners to manage their woodlands. Kingsley et al. (1 988) used focus groups for retired West Virginia NIPF owners to gain insight into their attitudes. Retired owners tended to value their roles as forest stewards, were responsive to the natural resource needs of society and future generations, and minimized the financial aspects of timber management.

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[2]Early adopters are characterized as individuals who are respectable, opinion leaders. Late adopters are skeptics; they respond to ial pressure to con form, rather than a well-thought decision (Doolirrle and Straka 1987).

[3]Midsouth States are Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas (Rosson and Doolittle 1987).

In their study, Kluender et al. (1997) reported that focus group interviews provided good insights into understanding NIPF owners in Arkansas. Kluender et al. identified differences in land use preferences and use of incentive programs. In the Delta and southwest Arkansas, NIPF owners showed interest in growing and selling trees and in using cost-share programs in establishing and growing their trees. In other regions (e.g., the Ouachita and the Ozarks regions), NIPF owners preferred grazing and recreational uses of their forest lands. NIPF landowners in the Ouachitn and Ozarks regions did not like to sell their trees and did not have any further sale plans. These NIPF landowners in the Ouachita and Ozarks regions own their land with an interest in protecting the environment without necessarily making money.

In another study, Williams et al. (1336) esnmined Arkansas NIPF landowners' opinions and attitudes regarding management and use of forested property. Their focus group participants were particularly concerned abour timber theft, trash dumping, hunting and improper payments when selling trees.

Focus group discussions showed regional differences. The participants from the Southwest and Delta regions shared similar themes in their discussions (Williams et al. 1996). Southwest and Delta regions participants were aware of incenrive programs and many owned and sold trees for logs or pulpwood. They also have received other benefits, such as recreation on their forest land. Participants from the Ouachita and Ozarks regions showed their interests to be in grazing and recreation. These participants were not aware of the incentive programs aimed at forested properties and were not benefitting from them.

According to Williams et al., most of these participants considered themselves as middle of the road environmentalists (i.e., they consider themselves to be land stewards), yet they lacked knowledge about the Endangered Species Act and the Clean Water Acr. Furthermore, they did not want land use regulations restricting activities on their land.

Selected Timber Investment Studies

Several studies in recent years have examined investments in intensive-pine-plantation management. For example, Biblis et al. (1998) reported that loblolly pine plantations can be managed to produce pulpwood at age 20, and quality sawtimber at about year 50. Their results indicated that the expected rate of return (real) on investment was 7 percent. Also, managing a loblolly pine plantation for sawtimber production based on a 50-year rotation is more desirable financially than managing the same stand for pulpwood production based on a 20-year rotation. Furthermore, Biblis et al. pointed out char if the price of sawtimber is $450 per thousand board feet (MBF) Doyle and pulpwood price is S35 per cord, the superiority of the sawtimber management option still holds at discount rates of 7 and 8 percent. However, pulpwood becomes more attracrive at higher discount rates or at relatively lower prices for sawtimber and higher prices for pulpwood.

In another study, Dangerfield and Moorhead (1998) examined lease rates for old field loblolly pine plantations in Georgia, and found that pine production on marginal soils can return higher producer profits than crops grown on these soil types.

According to Dangerfield and Moorhead, current intensive-pine-plantation management practices are aimed at short-rotation production of fiber. Intensive management practices enable current 20-25 year pulpwood rotations to be produced at 12 to 15 years or less, while producing the same fiber volumes. Also, projections for intensive-pine-planration management practices could produce a suitable level of current annual fiber supply on 70 percent of the land base currently in forest production. Dangerfield and Moorhead concluded that very productive land areas with good timber markets may earn expected lease values higher than areas with less productive land. Management decisions regarding silvicultural treatments (i.e., thinning, methods of thinning, and fertilization) in conjunction with stumpage price levels could influence the finan-

cd performance of a pine stand.

According co Borders and Bailey (1997), the era of intensive management of loblolly pine planrations in the southern Unired States is rapidly approaching. Using data from a 9-year-old loblolly pine plantation, Borders and Bailey found char when the plantation was subjected co complete weed control and multiple fertilizations the growth increased tremendously. In fact, the growth rates of loblolly pine planrarions were abour equal or exceeded rhose for southern pines grown in other countries under intensive cultural practices. Due to rhe loblolly's continuing growth through age 15 and rheir economic potential, Borders and Bailey concluded that these cultural practices for intensive management will be excellent financial investments for most forestland owners.

One conclusion that can be drawn from the results of previous research presenred above is that concerns about the furure timber supply in Mississippi due to inadequate regeneration of pine stands after harvest can be addressed at least in part by encouraging individual landowners to regenerate rheir stands after harvest with intensive-management of pine instead of failing to provide for regeneration of desirable species.

Incentive Programs in Mississippi

Four incentive programs are currently available to Mississippi NIPF landowners. First is the Forestry Incentives Program (FIP), authorized by congress in 1973 to share rhe cost of tree planting and timber stand improvement with private landowners. The Federal share of these costs ranges up to 65 percent depending on the cosr-share rate set by rhe State of Mississippi and each county by the Farm Service Agency (USDA Forest Service 2000).

The second incentive program is the Mississippi Forest Resource Development Program (FRDP) (Mississippi Forestry Commission 1996). FRDP provides financial assistance to eligible landowners for establishing and improving a crop of trees. The program helps Mississippi landowners to offset forest expenses by sharing the cost of implementing specific forestry practices designed to produce timber and enhance wildlife development-. Cost-share payments cover 50-75 percent (depending on rhe practice) of the total cost of implementing one or more forestry practices, not to exceed a maximum limit set for each individual practice. Eligible landowners can receive up to $5,000 of FRDP assistance every year. In turn, a landowner agrees co protect rhe area (for which he/she is receiving FRDP assisrnnce) from fire and grazing and to properly manage the area for a minimum of ten years.

The Conservation Reserve Program (CRP), authorized by Public Law 99 -198, is the rhird incentive program. The CRP provides incentives to landowners to convert highly erodible acreage to trees and grasses. A key component of the CRP is chat landowners receive annual cash payments for ten years or more following planting (USDA Forest Service 2000).

The 1939 Mississippi Reforestation Tax Credit (RTC) is the latest incentive program targeting NIPF owners in Mississippi. The new Reforestation Tax Credit allows landowners to reduce their taxes by up to 50 percent of the cost of reforestation (Gaddis 1999). It is designed to encourage planting of commercial tree species on private lands. Joinr and individual taxpayers are eligible for a $50,000 lifetime tax credit. The credit can only be applied co Mississippi state income taxes due. If a landowner is eligible for a tax credit in excess of taxes due, he/she may carry ir forward to offset future taxes. Landowners can use the credit to partially recoup the cost of sire preparation, planting, seed bed preparation, seedlings, seed, and other practices used to establish a stand of trees. To participate in the program, landowners must have a reforestation plan written by a Mississippi Registered Forester or a forester who is a graduate of an accredited forestry school.

Even though incentive programs exist, NIPF landowners do nor always cake advantage of them. To illustrate, the majority (54.3 percent) of the 427 Mississippi NIPF landowners in a recent study who regenerated their timber stands following a harvest during the 5-year period 1994 through 1998 did not receive public cost-sharing funds for regeneration under either FIP, FRDP or CRP (Gunter et al. 2001). Since the study period predated rhe RTC, that option was not available. Similarly, the 402 Mississippi NIPF landowners in the same study who chose not to regenerate following a harvest did nor avail themselves of the available incentive programs either. Why don'r landowners take advantage of available incentives? One reason may be rhat they cannot come up with their share of the regeneration expenditures. The Mississippi Reforestation Investment Program is proposed as a solution to this perceived problem.

Procedures

The research team used the following procedures in developing the MRIP:

1. Worked with Mississippi Special Task Force for Economic Development Planning to tentatively describe a forestry initiative.
2. -- Delineated the need for and potential benefits and costs of such a program.
3. Shared the information from steps 1 and 2 with key decision-makers in a facilitated focus group session, obtained their feedback and made adjustments to the proposed program. Key decision makers included representatives from the following stakeholders: Mississippi Legislature, Mississippi Forestry Commission, Mississippi Treasury Department, Mississippi Forestry Association, Mississippi Development Authority, Mississippi Institutions of Higher Learning, and Mississippi State University.
4. Explained the proposed program to NIPF focus groups and assessed their interest.'
5. Evaluated administrative functions and organization structure:
6. Added related questions to a survey being conducted for another research project, "Behavior and Attitudes of NIPF Landowners Concerning Reforestation of Harvested Timberlands in Mississippi."
7. Summarized findings from Steps 1-6 and formulated a Model Reforestation Bond Program.

Decision-Makers Focus Group Feedback

A tentative description of the initiative, along with a preliminary financial analysis, was shared with key decision makers in a focus group meeting in Jackson, MS, in November 1999. Input from the focus group participants stimulated several changes to the initial proposal. The revised proposal featured the following key points:

Source of Funds

The State of Mississippi would sell zero-coupon bonds to raise monies for the program

General Loan Provisions

Monies raised would then be loaned to NIPF landowners as follows:

Reforestation - To pay the total cost of reforestation (i.e., site preparation and planting) of suitable pine sites.

Additional loan - Up to $2 j/acre/year for IO years would be available as an option. Use of these funds would be entirely at the landowner's discretion.

***Rntr** of interest* - Equal to that paid by rhe State on the bond issue plus a small charge for loan administration (e.g., 7 - 7.5 percent).

Payment Schedule

Payment of principal and interest would be postponed until trees are harvested

Reforestation loan only -A minimum payment of 50 percent of net revenues would be required at all thinnings

Reforestation loan and additional loan - A minimum payment of 7j percent of net revenues would be required at all thinnings.

Payoff - Loans could be repaid in whole or in part at any time;

Maturity - All loans would have to be repaid in full by the end of 35 years or at final harvest of the stand, whichever occurs first.

Collateral

Underlying land - Borrowers would be required to put **up the** reforested land as collateral for the loan(s).

Existing first mortgage -**The** State would rake a second mortgage provided there is sufficient value remaining to provide security for the loan(s).

Appraisal - Landowners would be required to provide an appraisal of rhe property.

Eligibility

Residents - Only Mississippi residents would be eligible.

Non-residents - Non-residents would be eligible only if the) are co-owners with a Mississippi resident.

Co-ownership - At least one co-owner would have to be a Mississippi resident at the initiation of a loan.

Minimum Acreage

Ten acres would be the minimum acreage to be reforested

Lifetime Loan Cap

The maximum amount any forest landowner could borrow during his/her lifetime would be $50,000.

Insurance

Borrowers would be required to carry a com mercial insurance policy to cover the risks of seedling mortality, fire, wind and ice **storm,** insects and **diseases. and theft.**

Other State and Federal Reforestation Incentive Programs

MRIP could **only he** used in conjunction with the Mississippi Reforestation Tax Credit Program.

Program Administration

The Mississippi Forestry Commission would provide technical assistance to borrowers in developing reforestation plans, **processing** loan applications, and making sure the plans are followed. The Mississippi Development Authority would handle the record keeping and those financial activities related to making the loans.

Input from NIPF Landowner Focus Groups

Focus group theory and practice holds that the more things people have in common, the less reticent they feel about speaking up and the more likely they are to participate in a group discussion (Krueger 1994). Thus, in the four NIPF landowner focus group sessions conducted as part of rhis project, participants at each session were selected on rhe basis of some common characteristic(s), Conversely, researchers also wanted to rap into a cross-se&on of view from the broad spectrum of persons that comprise the NIPF landowner category. Thus, the makeup of the focus groups was heterogeneous across groups, but homogeneous within each group (Table 1).

Table 1. Location, Number of Participants and Distinguishing Characteristics of NIPF Focus Groups.

Location	No.	Distinguishing Characteristics
Alcorn State University (SW MS)	8	African-American Landowners
Hattiesburg (SE MS)	5	"Under-served Landowners" (Non-participants in government programs)
Raymond (Central MS)	8	Absentee landowners from Jackson metro area (Timber is often a secondary objective)
Oxford (North MS)	11	"Tree farmers" (Timber is a primary objective)

Input received in the landowner focus group sessions has been summarized and is presented below as "Salient Themes."

General feelings about participating in reforestation programs sponsored by the government:

- Lack of trust of' the government by minority and under-served landowners.
- Absentee landowners and tree farmers: Would give opportunities to those landowners who don't otherwise have the opportunity.
- Fear among owners of small tracts that programs like MRIP are a ploy by Government to cut them from existing social welfare programs.

Borrowing money for reforestation:

- MRIP will be attractive so long as there is a return on investment that will beat the leading rate.
- Landowners were concerned that their heirs will have responsibility of paying off the loan.

Interest in borrowing money for total cost of reforestation under MRIP:

- Vast majority of minority landowners were not interested: rhey are cautious about borrowing money.
- Under-served landowners would be interested and suggested an option of letting people make payments annually or monthly to avoid the accumulation of interest.
- Absentee landowners showed no interest, unless the interest rate is reduced to 2 percent, and if standing trees serve as collateral.
- 0 Majority of tree farmers would borrow money under MRIP.

Interest in borrowing money for total cost of reforestation and additional loan of up to $25/acre/year for 10 years:

- 0 Minority, under-served, and absentee landowners were nor interested in an additional loan, questioning if it is worth while for small-tract landowners who do not want to add debt burden to their heirs.
- 0 **Among** tree Farmers, several participants were interested in an additional loan, bur most were not. Interest hinged on the lending rate in comparison to the rates of return available on alternative investments.

Land to serve as collateral for the loan:

- 0 Independently and on their own, all four landowner groups agreed by consensus that insured standing trees - not the land - should be taken as collateral.

Insurance for the new pine stand against all unforeseen calamities:

Landowners made the following suggestions:

- 8 Insurance cover 100 percent of the **loan** (i.e., no deductible).
- The state should develop a program that will work like a group policy.
- The premium should be a fixed cost in the program, established on the front end.
- The value of the loan should be insured, not the value of the timber.
- 0 Self-insurance would probably be better than to rely on commercial carriers.

What landowners like or like most about MRIP:

- MRIP will assist a diverse group of landowners, who would not otherwise have the opportunity, to put their idle forest land into production.
- MRIP will take a second mortgage.
- Loan payments will be tied to timber harvests.
- 0 MRIP might entice **young** people or heirs to plant cutover sites.
- Landowner does not incur out-of-pocket expenses as compared to cost share programs.

What landowners do not like, or their biggest concerns about MRIP:

- Minority and under-served landowners:
  - Whether MRIP will get off the ground and be there for us;
  - Compound inreresr on rhe loan;
  - Fear that the State will rake over properr); if rhe landowner defaults on rhe loan;
  - Concern about tenancy in cotnmon and the lack of clear rides of many African-American landowners.

- Absentee landowners:
  - Do nor like rhe government getting control of their land and money;
  - Fear of escalating insurance rates;
  - Land, not trees, serving as collateral.

- Tree farmers:
  - Concerned about the availabilitv of insurance and irs cost.

Overall assessment of the proposed MRIP:

- All srnkeholders must put forth a lot more effort to put it into place.

0 Alternate sources of funds are needed for- MRIP.

- Proposers of MRIP need to conduct cash flow analyses with different scenarios that include site indices and after-tax calculations.

Survey Results

Concurrently with this study, the senior author was involved in a telephone survey examining the "Behavior and Attitudes of NIPF Landowners Concerning Reforestation of Harvested Timberlands in Mississippi." The opportunity presented itself to insert two questions specific to MRIP into those interviews. The interviewees were NIPF landowners who had made a final harvest within the last 5 years; the sample included 427 regenerators and 402 non-regenerators. The two MRIP-specific questions and a summary of interview responses follows.

Question Number 1. Suppose the State of Mississippi would loan you money at a competitive rate of interest (e.g., 7.0 - 7.5 percent), and you would not have to repay the loan until the trees are harvested, and you had to put up the reforested land as collateral for the loan; would you be interested in borrowing the money to pay the total cost of reforesting the tract, assuming it would be profitable in the long term?

"Yes" responses among regenerators (36.8 percent) differed significantly from non-regenerators **(28.1 per-**cent) at $\alpha = 0.05$. "Yes" among regenerators was positively influenced by income, age and gender (39.9 percent of the males versus 23.5 percent of the females). Size of holding, race and education did not significantly influence a "Yes " response among regenerators.

"Yes" responses among non-regenerators was positively influenced by gender **(31** .O percent of the males versus 20.0 percent of the females), race (40.4 percent of blacks versus 26.6 percent of whites), age and level of education. Size of holding and income did not significantly influence a "Yes" response among non-regenerators.

Question Number 2. Would you be interested in receiving the original reforestation loan and an additional loan **of $25.00 per acre** per **year** for 10 years, **if the** additional funds could be used for anything **you choose?**

Adding the additional loan of $25/acre/year for 10 years increased the number of "Yes" responses over the reforestation loan only by 6.1 percent (36.8 percent to 42.0 percent) among regenerators, by 8.2 percent (28.1 per cent to 36.3 percent) among non-regenerators for a combined total increase of 7.1 percent (32.6 percent to 39.7 percent). The largest increase in level of interest, 12.8 percent, came from black non-regenerators (versus 7.7 percent among white non-regenerators).

Prevalent reasons expressed by landowners who responded "NO" to Questions 1 & 2 in the telephone survey have been categorized and are summarized as follows:

1. Long term nature of the investment:
   - they wouldn't be alive when the investment matures;
   - are too old;
   - are retired or ready to retire;
   - do not want to tie the property up for many years, etc.

2. Interest:
   - too long for interest to compound;
   - don't like to pay interest to anybody;
   - interest would eat up your profit, etc.

3. Collateral:
   - not interested in putting land up as collateral;
   - too risky and might lose land;
   - "I do not want to put up my place for anything," etc.

4. Revulsion to debt:
   - scared of debt;
   - nor interested in going into debt or borrowing money period;
   - would have to be repaid/would like to leave it to my children, etc.

5. Trust in government:
   - rather handle it on my own;
   - do not believe the government and would rather pay as we go;
   - government programs have too many strings attached, etc.

Will it Work Financially

In response to requests from the landowner focus groups, the research team analyzed the marginal cash flows from a series of bond-financed reforestation investments in relation to doing nothing on both a before- and after-tax basis. Three levels of soil productivity as measured by site index (SI) and three rates of interest were examined to simulate a range of possible conditions.

Sire index is the average height of dominant trees in a stand at a specified base age (Helms 1998). In the South the base age for natural stands of pine is customarily 50 years, while 25 is the usual base age for plantations. This paper reports both. Thus, a site of 93/70 means that the dominant trees will average 33 feet tall at 50 years old or 70 feet tall at 25 years old. The three soil productivity classes for loblolly pine examined were: low (SI 67/50), average (SI 80/60) and high (SI 93/70). Average cost of site preparation and hand planting of 650 seedlings of pine was assumed to be $1 55.00 per acre.

Cost of self-insurance by the Stare of Mississippi was added co the reforestation investmenr to protect the trees against seedling mortality, fire, wind and ice storm, insect and disease, and theft losses. The one time, up-front insurance premium was based on a quote from an experienced commercial carrier, excluding the carrier's profit margin.

The analysis was conducted using WINYIELD, a forest growth and yield model useful for estimating the investment returns on pine plantations in the South (Hepp 1997). The analysis was done on a "nominal basis," which means that 3 percent inflation was included over the invesrment period (35 years). It was assumed that funds for the total cost of site preparation, planting and insurance would be loaned to rhe landowner at three different interest rates. Discount rates were 6 percent, 8 percent and 10 percent before taxes, which equates to 4. IO percent, 5.47 percent and 6.84 percent after taxes, respectively. Federal marginal tax rates were assumed to be 28 percent of ordinary income and 20 percent of capital gains, while a 5 percent marginal tax rate was assumed for the State of Mississippi for both ordinary income and capital gains. Standing timber price assumptions for pine products were pine sawtimber at $4 15.50/MBF, Doyle; pine chip-n-saw at $90.00/cord; and pine pulpwood at $28.00/cord. At ages 15 and 25 the standing pine trees were assumed to be thinned, and at age 35 rhe entire tract was assumed to be harvested. The financial performance measure used was Net Present Value, which is the present value of discounted revenues minus the present value of discounted costs (Gunter and Haney 1984).

Table 2 illustrates an example of the marginal analysis of discounted cash flows from a bond-financed reforestation investment with lobtolly pine versus doing nothing, for the average or mid-range situation, site index 80/60, per acre basis, before and after state and federal taxes, at interest rates of 8 percent before taxes and 5.47 percent after taxes.

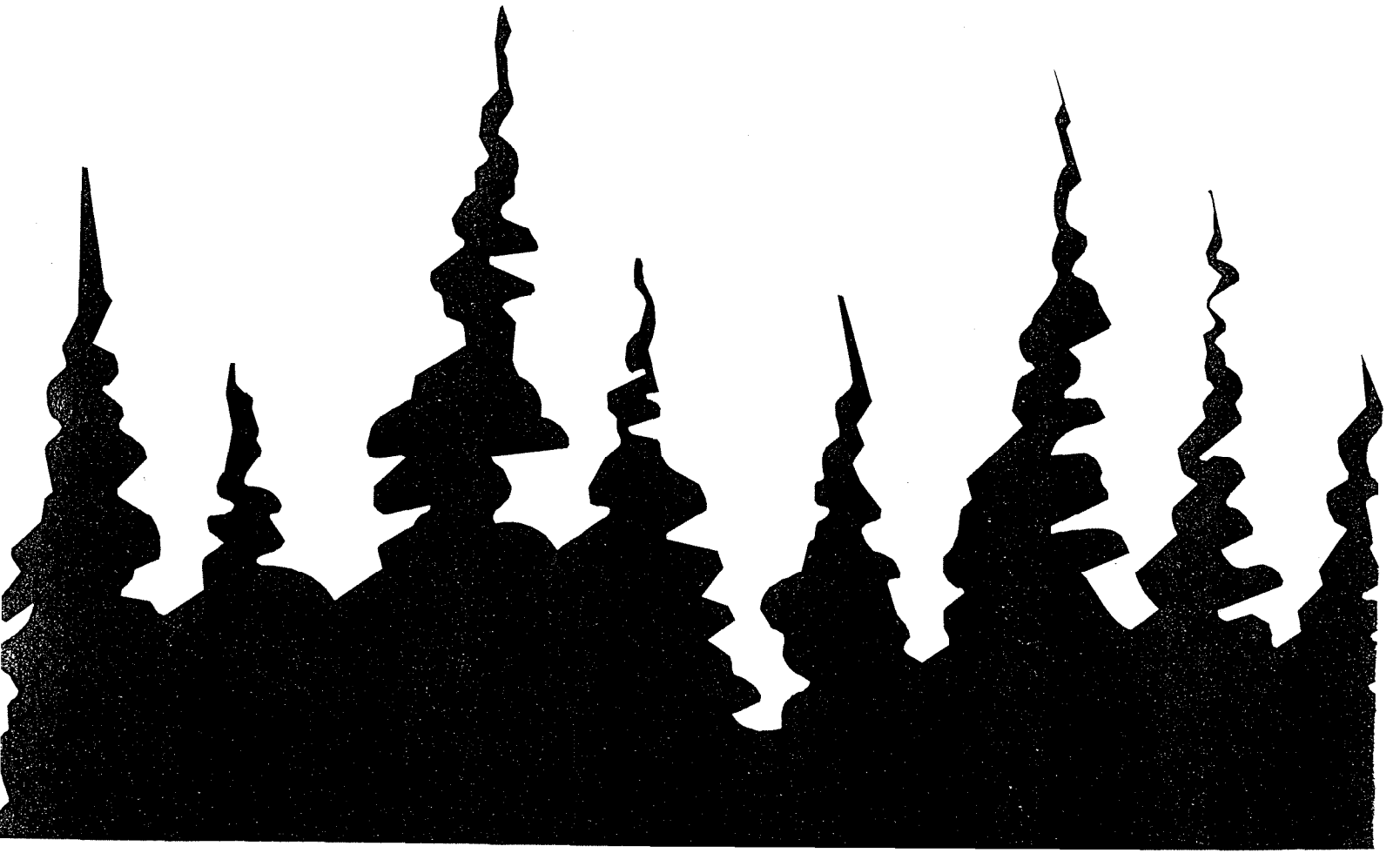

Table 2. Marginal Analysis of Cash Flows from a Bond-Financed Reforestation Investment vs Doing Nothing, Before and After State and Federal Taxes, Per acre Basis; Interest Rates = 8% Before Taxes and 5.47% After Taxes', Inflation Rate=3%, and Sire Index =80 @ 50 years / 60 @ 25 years.

1	2	3	4	5	6	7	8	9		10	11
Year	Item	Loan Principal & Interest ($)	Expense ($)	Revenue ($)	Cash-Flows, Before-tax ($)	Present Value, Before-tax @ 8%	Amorcizacion ($) FED	MS	Tax Liability or Benefit ($) FED	MS	Cash-Flows, Afeer-tax ($)	Present Value After-tax @ 5.47% ($)
0	Sire Prep & Plant-Pine		-155.00									
0	S P & P - Do Nothing		0.00									
0	Marginal S P & P		-155.00		-155.00	-155.00					-155.00	-155.00
0	Insurance Premium		-40.00		-40.00	-40.00			11.209	1.44	-27.36	-27.36
0	Reforestation Loan	195.00		195.00	195.00	135.00			0.00	0.00	195.00	135.00
1	10% Federal Tax Credit								15.50	0.00	15.50	14.70
1	50% MSRTC								0.00	77.50	77.50	73.4s
1	Amortization (1/ 14)						1 0.52[d]	0.00	2.95	0.00'	2.35	2.80
2	Amorriznrion (1/7)						21.04	0.00	5.89	0.00'	5.89	5.3
3	Amortization (1/7)						21.04	0.00	5.89	0.00,	5.89	5.0
4	Amorriznrion (1/7)						21.04	0.00	5.89	0.00	5.89	4.7'
5	Amorriznrion (117)						21.04	0.00	5.89	0.00	5.89	4.5
6	Amorrizarion (1/7)						21.04	0.00	5.89	0.00	5.89	4.2;
7	Amorriznrion (1/7)						21.04	0.00	5.89	0.00	5.89	4.0(
8	Amortization (1/ 14)						10.52	0.00	2.35	0.00	2.95	1.9:
15	Thinning Revenue			96.0 1	36.0 1	30.27			-19.20[e]	-3.46	73.35	33.0(
15	Loan Payment & Interest	554.01	-48.00		-48.00	-15.13			13.44	1.73	-32.83	-14.7;
2 5	Thinning Revenue			664.82	664.82	97.0s			-132.96	-23.93	507.93	134.15
2 5	Loan Payment & Interest	104 1.64	-332.4 1		-332.41	-4s.54			93.07	11.37	-227.37	-60.05
3 j	Final Harvest - Pine			9,270.61								
3j	Final Harvest Do Nothing			-842.05								
3 5	N larginal Revenue			8,428.56	8,428.56	570.06			-1,685.71	-303.43	6,439.42	998.47
3 5	Loan Pay-off	1,462.92										
	Principal		-195.00		-195.00	-13.19					-195.00	-30.24
	Interest		-1,267.92		-1,267.92	-85.76			355.02	45.65	-867.26	-134.47
					NPVbt	=$559.18					NPVat	=$1,059.57

[a] $i_{at} = i_{bt}[1-(T_{US} + (T_{MS}(1-T_{US})))]$;

Where: i_{at} = Interest rate, after tax; i_{bt} = Interest rate, before-tax; T_{US} = Federal tax rate; T_{MS} = State tax rate.

$i_{at} = 0.08\ [1-(0.28+(0.05(1-0.28)))] = 0.08[1-(0.28+(0.05(0.72)))] = 0.08[1-(0.28+(0.036))] = 0.08[1-0.316] = 0.08[0.684] = 5.47\%$

[b] Tax-benefit to be charged against other income: T_{US} (insurance premium) = 0.28($40.00) = $11.20

[c] Column 10 = Column 6 + Column 9

[d] 1/14 (0.95)(Amortizable basis) = 1/14(0.95)($155) = $10.52; [e] t(taxable capital gains income) = (0.20)($96.01) = $-19.20

[f] NPVbt = Net Present Value, Before-tax; [g] NPVat = Net Present Value; After-tax.

Marginal net present values, after taxes, for the rhree site indexes and interest rates are summarized in Table 3. The large positive values indicate clearly that returns are quite attractive across a broad range of soil productivity and lending rates. This is due in large measure to the use of financial Leverage coupled with state and federal tas incentive packages. Further sensitivity analyses revealed that the profitability of the reforestation investment is of such magnitude that it can withstand substantial downside stumpage market risk (i.e., a 50 percent reduction in current timber prices) even on poor sires at fairly high races of interest. It appears likely that MRIP could generate significant wealth for landowners at no net cost to the State.

Table 3. Marginal Net Present Values, After Taxes, for a Bond Financed Reforestation Investment vs. Doing Nothing, Per Acre Basis, for Low, Average and High Soil Productivity in Mississippi.

Site Index*	Interest Rate, After-Tax		
	4.10%	5.47%	6.84%
Low (67/50)	$1,157.46	$633.30	$356.22
Average (80/60)	$1,733.78	$1,059.57	$603.35
High (93/70)	$2,687.70	$1,677.09	$940.42

* 50 year basis / 25 year basis

The Recommended Model Mississippi Reforestation Investment Program

As the final outcome of the focus group meetings, the telephone survey, and data analysis, this research team recommends that MRIP take the following form.

Source of Funds

Funds to finance the program would be raised by the State of Mississippi through the sale of bonds. Since the State has a good credit rating, the rate of interest payable on the bonds should be favorable. Additionally, the Srate may enter inro agreements with other private (e.g., forest products or energy companies) or governmental organizations and may accept contributions, gifts or grants from any source to carry out the duties, functions and the powers of MRIP.

We suggest that the State and its agents promote MRIP and explore funding from the energy companies. The energy companies could receive carbon sequestration credits to offset greenhouse gas emissions for the trees planted with the funds they provide, plus interest monies from long-term bonds.

Reforestation Loan

The reforestation loan monies raised from the bond issue would be used to fund up to 100 percent of the cost of reforestation (i.e., site preparation and planring) of suitable pine sites. The inclusion of old fields along with cutover pine sites is highly recommended. Old fields cost less to plant, have higher yields and the trees planted there incrementally sequester more carbon than they do on cutover sites.

The additional loan of $25 per acre per year for 10 years should be dropped from the proposed program. It only increased the "Yes" responses by 7.1 percent, and it takes away monies from a given pool of funds that otherwise would go directly to reforestation. It has no value to external funding sources, and in reality is a consumer loan.

Rate of Interest

The rate of interest charged on the reforestation loan would be equal to that paid by the Stare on the bond issue plus a small charge for loan adminisrration. The actual lending rate should be very comperirive with that charged by commercial lenders. If energy companies will invest their funds in MRIP, the interest rate on long-term bonds may be well below the market rate, because the energy companies could also receive carbon offset credits.

Payment Schedule

Payment of principal and interest on the reforestation loan would be postponed until the trees are harvested. A minimum payment of 50 percent of net revenues would be required at all thinnings. The loan could be repaid in whole or in part at any time, but has to be paid in full by the end of 35 years.

Collateral

Collateral would be required to secure a reforestation loan under MRJJ? If the *land is owned free nnd clear, the insured standing trees* could serve as collateral. (Note: The research team feels strongly that taking the trees, instead of the land, for collateral will substantially increase interest in the program). IF there is an *existing first mortgage* on the land, the state would take a second mortgage on the *land and standing trees* provided rhe remaining value is sufficient to secure the loan. A required appraisal to determine the value would be the landowner's responsibility. It is recommended that the lien on standing trees incorporate the steps taken by the Oregon Forest Resource Trust in addressing the issue of collateral (State of Oregon 1335). That is:

> *" The lien created is a general lien upon all jorest products grown or grozuing on the forest land, whether standing on forest land, severed nnd remaining on the forest land, severed nnd transported to another area of sale or processing, or made into forest products on the forest land. If t fe orestp roduc is severed nnd delivered to a purchaser or mill, the lien continues against the forest product nnd the lien also attaches to accounts receivable evidencing indebtedness of the purchaser or mill. The lien attaches to the accounts receivable on the date on which the forest land ozuner sells the forestprodzrrts and relates back to the date on which the notice of lien was filed. "*

Eligibility

Only non-industrial, private forest landowners who are residents of Mississippi would be allowed to participate in the program. Non-resident landowners would be eligible only if they are co-owners with a Mississippi resident. At least one co-owner would have to be a Mississippi resident at the initiation of a loan.

Minimum Acreage

The land area reforested under the program would have to be at least ten (10) acres in size.

Lifetime Loan Cap

Maximum lifetime loan value would be $50,000 per forest landowner. If the cost of site preparation, planting and insurance were $200 per acre for example, a total of 250 acres could be put into the program during a landowner's lifetime.

Insurance

Losses to seedling mortalit); fire, wind and ice storms, insects and diseases, and theft would be covered through a self-insurance program administered by the State to cover 100 percent of the value of rhe reforestation loan for the entire rotation. A one-time, up-fronr insurance premium would be added to the reforestation loan.

Other State and Federal Reforestation Incentive Programs

The Mississippi Reforestation Jnvesrment Program could be used in conjunction only with the Mississippi Reforestation Tax Credir and the Federal income tax incentives for reforestation.

Program Administration

The Mississippi Forestry Commission would provide technical assistance to borrowers by helping them develop reforestation and subsequent stand management plans, processing loan applications and making sure the plans are followed as prescribed. The Mississippi Development Authority would handle the record keeping and those financial activities related to making the loans. A trust should be set up to administer funds from external sources such as energy companies.

Recommendations

While it would be open to all qualifying NIPF landowners, to have the greatest impact MRIP could target non-regenerators, many of whom are minorities and females. Hurdles to be overcome among the target group include lack of interesr, lack of trust in the government, lack of information, murky land titles, the relative size of the lending rate itself, and collateral requirements.

If MRIP is enacted into law, the State and its agencies should provide educational/outreach programs that will fully inform potential participants of how the program will work and the benefits they will receive, including tax incentives, the costs to be incurred, and the associated risks. A computer program that performs analyses and can be customized to an individual landowner's circumstances should be developed and made available through local extension and forestry commission offices; this would assist landowners in making a decision about entering into the program.

The State also should consider seeking external sources of funds for MRIP from energy companies. There appears to be an opening window of opportunity to tie tree planting by NIPF landowners and the carbon thus sequestered to acquisition by energy companies of carbon offset credits. Energy companies could use the carbon offser credits as a way of compensating for greenhouse gas emissions while earning interest on an MRIP zero-coupon bond

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